8. INCOME SOURCES OF THE MALNOURISHED POOR IN RURAL ZAMBIA

Shubh K. Kumar

INTRODUCTION

This paper studies the income sources and characteristics of rural households in a relatively well off agricultural region in Zambia, in order to identify how the malnourished differ from the rest of the households. Both caloric adequacy and child nutritional status are used as discriminating factors to separate households into poorly and well-nourished households. Household demographic characteristics are used to derive the number of adult equivalents in the households.[34]

DATA

This data is derived from a sample of about 300 households drawn from ten study sites distributed in each of the nine districts of the Eastern Province of Zambia. The sampling procedure adopted is thus expected to give a representative sample of households from the whole Province.

The Eastern Province is among the most agriculturally progressive regions in Zambia. However it is different from the other agriculturally better off parts of the country in that it is located away from the 'line of rail' which is the area with the best level of infrastructure and nonagricultural economic activity. Other characteristics of the Eastern province include a very low population density—about 7 persons per square km in rural areas in 1980.

The data collection procedure consisted of monthly visits to each household during which both socioeconomic and dietary information was obtained. Food consumption was derived from a modified food expenditure record in which adjustment was made for foods actually consumed during

---

[34] The daily caloric requirement per adult equivalent (adult male with a moderate level of activity) used is 3100. This corresponds to the figure of 2800 used for the Bangladesh case. The difference is due to the larger body size of the Zambian population relative to that of South Asia. Even though agricultural work is usually classified as heavy work, agricultural workers were given a moderate requirement due to the uneven nature of agricultural work. This lower figure is therefore a more conservative estimate, and is likely to be more applicable to the annual average level of requirements. This figure would therefore not be appropriate for assessing seasonal dietary adequacy. In the case of this paper, that is not an objective, and annual average dietary figures are used.

the past week. It is expected that this method would produce a more accurate reflection of intake than the simple expenditure record. Dietary information represents the annual consumption aggregated for 12 months of observations. For these tables, only those individuals measured during the February anthropometric survey and their annual household intakes are included.

Anthropometric measurements were recorded for all household members four times during the year. In this paper, the figures presented are for the measurements taken in the month of February at which time the level of nutrition status was found to be the lowest for the year. As in the other cases, the sample size in the anthropometric tables is different from the dietary results where all households are included. For anthropometric results, only children under five years of age are represented.

EXTENT OF MALNUTRITION BY FARM SIZE AND INCOME

The overall extent of malnutrition in the sample is found to be surprisingly high—about 38 percent of individuals were in households with less than 80 percent of caloric requirements for the year. About 30 percent of preschoolers were malnourished (below 80 percent of reference weight-for-age). From the results, it does appear that there is considerable overlap between these two indicators, in spite of the difference in sample sizes and composition.

It is also interesting that results in the case of both diet inadequacy and child malnutrition show a different pattern of association with farm size and with per capita household income. In the case of farm size (this does not include fallow land), there is an inverse relationship with diet adequacy. The lowest tercile of farm size have about 40 percent with less than 80 percent of caloric adequacy, those in the highest tercile have about 44 percent, while the middle tercile does somewhat better than the other two groups, with about 30 percent below 80 percent adequacy (Table 65).

The results for child malnutrition are similar in some respects. The middle farm size tercile again appears to be doing the best, with about 25 percent below 80 percent of reference weight-for-age (Table 66). The figure for the bottom farm size group is 34 percent and about 30 percent for the top group.

There is a clear and direct linear association between per capita household income and dietary adequacy. Over 70 percent of the bottom income tercile have less than 80 percent diet adequacy. That figure decreases to 31 percent in the second tercile and to 11 percent in the top income tercile. Similarly, severe diet inadequacy (below 60 percent of adequacy) affects 31 percent of the bottom income, 10 percent of the middle, and 0 percent of the top income group, which suggests a strong income caloric intake association.

Table 65--Prevalence of malnutrition in different groups, Zambia, 1986

Group	Sample Size	Dietary Adequacy of Households (Calories) <60 Percent	60-80 Percent	80-120 Percent	>120 Percent
		(household member and percent shares)			
Farm size	715	95 (13.3)	177 (24.8)	265 (37.1)	178 (24.9)
Small (0-1.1 hectares)	227	24 (10.6)	66 (29.1)	72 (31.7)	65 (28.6)
Medium (1.1-2.53 hectares)	242	30 (12.4)	43 (17.8)	109 (45.0)	60 (24.8)
Large (> 2.53 hectares)	246	41 (16.7)	68 (27.6)	84 (34.1)	53 (21.5)
Per capita income tercile	722	103 (14.3)	177 (24.5)	265 (36.7)	177 (24.5)
Low (<366.3)	249	78 (31.3)	100 (40.2)	64 (25.7)	7 (2.8)
Medium (366.3-674.3)	258	25 (9.7)	54 (20.9)	138 (53.5)	41 (15.9)
High (>674.3)	215	0 (0.0)	23 (10.7)	63 (29.3)	129 (60.0)

Source: IFPRI/RDSB/NFNC Survey on Growth and Equity in Eastern Province, 1986.

Table 66--Prevalence of child malnutrition (children aged less than 5 years) in different groups, Zambia, February 1986

Group	Sample Size	Weight-for-Age of Children < 5 Years <60 Percent	60-80 Percent	>80 Percent
		(preschoolers and percent shares)		
Farm size	169	5 (3.0)	45 (26.6)	119 (70.4)
Small (0-1.1 hectares)	56	1 (1.8)	18 (32.1)	37 (66.1)
Medium (1.1-2.53 hectares)	57	1 (1.8)	13 (22.8)	43 (75.4)
Large (>2.53 hectares)	56	3 (5.4)	14 (25.0)	39 (69.6)
Per capita income tercile	171	5 (2.9)	46 (26.9)	120 (70.2)
Low (<366.3)	68	3 (4.4)	18 (26.5)	47 (69.1)
Medium (366.3-674.3)	61	2 (3.3)	15 (24.6)	44 (72.1)
Large (>674.3)	42	0 (0.0)	13 (31.0)	29 (69.0)

Source: IFPRI/RDSB/NFNC Survey on Growth and Equity in Eastern Province, 1986.

Child malnutrition results show a similar pattern, particularly for the severely malnourished category. The prevalence of this group is highest in the lowest income group, 4.4 percent, and decreases to 3.3 percent in the middle group and to 0 percent in the top income group. The differences in the moderately malnourished and well nourished categories are less marked.

The results suggest that

- while diet improvements continue to occur with income increases, income alone appears to be able to eliminate only the most severe forms of child malnutrition; and
- farm size alone is a poor identifier of the malnourished poor.

INCOME SOURCES AND PREVALENCE OF MALNUTRITION

The two groups with inadequate diets also have below average per capita income (Table 67). Per capita income nearly quadruples between the lowest adequacy level and the highest adequacy level. Differences are not so marked in the case of the child malnutrition group. Only those children with severe malnutrition have low income levels on average, while the moderate malnutrition group has an average income level which is higher than the entire sample (Table 68).

All groups have a similarly high share of expenditures on food—about 75 percent of their total expenditure. There is only a very slight and imperceptible decline in this share of food expenditure from 78 to 74 percent, even with a near quadrupling of per capita income between the lowest adequacy level and the highest adequacy level (Tables 67 and 68). A sustained high share of food expenditure with substantial improvement in income and diet adequacy could indicate that there are continued noncaloric improvements in diet quality being made, or that diets are still perceived to be inadequate. The share of food expenditure from own production is similarly high, with only 25 percent of all food coming from purchases. The share of food purchases also does not change perceptibly between the groups.

Agriculture is the most important source of income for the sample households. Retained production alone provides about 77 percent of household incomes, with crop and animal sales providing an additional 17 percent (Table 67). Given the overwhelming importance of agriculture, agricultural income per se does not appear to be a very useful discriminating variable for assessing the malnourished poor—at least in the aggregate. However, those with poorer diets are more likely to retain a larger share of their agricultural production and to sell a smaller share. The share of nonfarm income increases slightly with better dietary adequacy. Income from remittances or gifts have not been included.

Table 67--Income sources of the malnourished rural poor (calorie consumption), Zambia, 1986

Group	Dietary Adequacy of Households (Calorie Consumption) <60 Percent	60-80 Percent	80-120 Percent	>120 Percent	Total Averages
Percentage of household income from					
Agriculture production retained	86.0	81.0	73.0	74.0	77.0
Wages	1.1	1.8	1.2	0.5	1.1
Nonfarm	2.7	4.1	7.1	4.1	5.0
Crop sales	7.8	11.0	17.5	19.4	15.2
Animal sales	2.7	1.2	1.3	1.9	1.6
Per capita total income/year (kwacha)	255.02	396.10	623.70	928.05	589.92
Proportion food expenditure (percent)	77.8	78.8	75.5	73.7	76.2
Proportion own-produced food expenditure (percent)	78.3	76.5	76.7	79.9	77.7
Total male-headed households	70	121	212	134	537
Percentage (percent)	13.04	22.53	39.48	24.95	100.0
Total female-headed households	33	56	53	44	186
Percentage (percent)	17.74	30.11	28.49	23.66	100.0
Non-hybrid maize user	69	157	151	94	471
Percentage (percent)	14.65	33.33	32.06	19.96	100.0
Hybrid maize user	26	20	114	83	243
Percentage (percent)	10.70	8.23	46.91	34.16	100.0
Fertilizer user	39	62	180	161	442
Percentage (percent)	8.82	14.03	40.72	36.43	100.0
Fertilizer nonuser	56	115	85	16	272
Percentage (percent)	20.59	42.28	31.25	5.88	100.0
Total land cultivated (hectares)	2.92	2.21	2.57	2.17	2.43
Per capita farm size (hectares)	0.269	0.283	0.439	0.432	0.376
Household size	10.5	7.9	5.7	4.8	6.7
Number of adult equivalents	6.7	5.3	3.7	3.3	4.4
Education of household head (last grade attended)	3.6	3.5	4.0	3.9	3.8
Education of female (last grade attended)	3.5	2.4	2.7	3.2	2.9

Source: IFPRI/RDSB/NFNC Survey on Growth and Equity in Eastern Province, 1986.

Table 68--Income sources of households with malnourished children (aged less than 5 years), Zambia, 1986

Group	Weight-for-Age of Children < 5 Years			
	<60 Percent	60-80 Percent	>80 Percent	Total Averages
Percentage of household income from				
Agriculture production retained	81.0	75.0	78.0	78.0
Wages	0.0	0.0	0.2	0.2
Nonfarm	1.3	8.0	7.0	7.0
Crop sales	15.0	16.0	13.0	14.0
Animal sales	2.0	0.7	1.8	1.5
Per capita total income/year (kwacha)	329.72	608.43	556.64	563.93
Per capita total expenditure/ month (11) (kwacha)	35.83	53.65	55.76	54.61
Proportion food expenditure (percent)	76.4	75.6	75.4	75.2
Proportion own-produced food expenditure (percent)	82.0	74.0	77.0	76.0
Total male-headed households	3	36	91	130
Percentage (percent)	2.31	27.69	70.00	100.0
Total female-headed households	2	10	29	41
Percentage (percent)	4.88	24.39	70.73	100.0
Non-hybrid maize user	3	29	74	106
Percentage (percent)	2.83	27.36	69.81	100.0
Hybrid maize user	2	16	45	63
Percentage (percent)	3.17	25.40	71.43	100.0
Fertilizer user	4	32	80	116
Percentage (percent)	3.45	27.59	68.97	100.0
Fertilizer nonuser	1	13	39	53
Percentage (percent)	1.89	24.53	73.58	100.0
Total land cultivated (hectares)	3.16	2.1	1.85	2.37
Per capita farm size (hectares)	0.34	0.3	0.38	0.36
Household size	10.3	6.9	6.9	6.98
Number of adult equivalents	6.5	4.3	4.4	4.4
Education of household head (last grade attended)	3	5	4.2	4.4
Education of female (last grade attended)	1.9	3.6	3.2	3.3

Source: IFPRI/RDSB/NFNC Survey on Growth and Equity in Eastern Province, 1986.

Even though the differences between the groups is very small, child malnutrition has some similar characteristics to diet adequacy. Children with severe malnutrition are more likely to be from households who retain a somewhat larger share of agricultural production, and have the lowest share of nonfarm income (Table 68). These findings suggest that the malnourished poor have a less diversified income source than other households in rural Zambia.

OTHER HOUSEHOLD CHARACTERISTICS

Female Head of Household

There is a higher percentage of female-headed households among the malnourished poor than in the population as a whole. Thus while about 38 percent of the total sample population has less than 80 percent caloric adequacy, 48 percent of female-headed households fell in this category. Similarly, 3 percent of children overall are severely malnourished, compared with nearly 5 percent for female-headed households.

Hybrid Maize Production

Households growing hybrid maize are less likely to have inadequate diets. Only 19 percent of hybrid maize producers have below 80 percent dietary inadequacy compared with 48 percent of those who are not hybrid maize-users (Table 67). However, the use of hybrid maize is not a good discriminating factor for identifying households with child malnutrition (Table 68).

Use of Fertilizers

Fertilizer use shows a similar pattern to that seen for hybrid maize production. Households who use fertilizers are less likely to have dietary inadequacies than those who do not. Less than 23 percent of fertilizer users have diets with less than 80 percent adequacy, compared with 63 percent for nonusers (Table 67). This may appear to be a useful indicator, since the majority of households do use fertilizers. However, the results for child malnutrition do not lend support to this criteria. Even though the differences are very small, the results may be indicative of changes that occur with fertilizer use. If labor use in agriculture is increasing with fertilizer use, then the results for diet would be in line with that (independent of the income effect of fertilizer use). For instance, increased labor use results in lower levels of child care, then the results would be a poorer child nutrition despite a higher caloric availability. Further research into this issue is required.

Farm size

Farm size has an unusual relationship with impoverishment as defined here. It appears that households with inadequate diets are likely to have somewhat larger farm sizes than households with a more adequate diet. However, the reverse is the case with per capita farm size—the more appropriate indicator of land endowment—which is lowest for those with inadequate dietary calories (Table 67). In the case of child malnutrition, per capita farm size does not differ between the groups (Table 68).

Household Size

Household size is found to be higher for the malnourished poor (Tables 67 and 68). For both indicators, the most severely affected households have an average household size of more than 10 members. In the case of dietary adequacy, both groups with below 80 percent caloric adequacy have above average household size, and, for those with above 80 percent caloric adequacy, household size decreases to below average. In the case of child malnutrition on the other hand, only the severely malnourished have an above average household size, with the other two groups showing a household size of about seven, the same as the sample average. Results for the number of adult equivalents parallels those for household size.

Education

Differences in education of both the household head and of females are clearer in the case of child malnutrition than in the case of dietary adequacy. Since dietary adequacy was earlier seen to be highly associated with income (which is primarily from agricultural sources), it appears that education, at least at the level at which it exists at present, may not be an important factor in agricultural production and income. That however, cannot be concluded from the present analysis, and it needs to be examined further. The education of both the head of household and of females is lower in the severely malnourished children's households, but in all the other groups is similar to the sample average.